AMENDMENTS TO THE DRAWINGS

Figure 2 has been amended to replace the label "21 seconds" with the label - -1 second - - for consistency with the disclosure.

Figure 3 has been amended to change numerical references 73 and 75 to 63 and 65 respectively, for consistency with the disclosure.

Figure 5 has been amended to change numerical references 73, 75, 76 and 78 to 63, 65, 90 and 88 respectively. In addition, numerical reference 76 and an accompanying lead line have been added to identify the Rx signal at the top of the page. Also the arrowhead on the denial of service attack signal depicted in the lower right hand portion of the drawing has been amended to point in the opposite direction.

REMARKS

Claims 2, 38, 39, 60 and 71 have been amended to make minor editorial amendments. The paragraph identified as paragraph 0092 in the application as published June 17, 2004, (page 19, 3rd paragraph) has been amended to correct an editorial error in numerical reference number 73 and 75. These have been corrected to read 63 and 65 respectively, for consistency with the drawings. Figure 2 has been amended to cause "21 seconds" to read "1 second". Figure 3 has been amended to change numerical references 73 and 75 to 63 and 65 respectively, for consistency with the disclosure. Figure 5 has been amended to change numerical references 73, 75, 76 and 78 to read 63, 65, 90 and 88 respectively. In addition, numerical reference 76 and an accompanying lead line have been added to identify the Rx signal at the top of the page. Also, the arrowhead on the denial of service attack signal depicted in the lower right hand portion of the drawing has been amended to point in the opposite direction.

35 U.S.C. § 101

The Examiner has rejected claims 38 and 39 on the basis that the claimed invention is directed to non-statutory subject matter. Claims 38 and 39 have been amended to provide for preambles as suggested by the Examiner and should now be in better compliance with 35 U.S.C. § 101. As such the Examiner's rejection has been overcome.

35 U.S.C. § 102

The Examiner has rejected claims 1, 2, 3-5, 11, 12, 15-22, 28, 34-37, 40-44, 49-51, 54-61, 67 and 70-75 based on 35 U.S.C. § 102(b) as being anticipated by An (Pub No: 2001/0040919).

The standard for an anticipation rejection under 35 U.S.C. § 102 has been well established by the Court of Appeals for the Federal Circuit, and is set forth in M.P.E.P. § 2131, which provides that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. In addition, the identical invention must be shown in as complete detail as is contained in the claim. For a prior art reference to anticipate a claimed invention, every element of the claimed invention must be identically shown in a single reference, and these elements must be arranged as in the claim under review.

Applicant's claim 1 is representative of independent claims 1, 37, and 40 and recites:

1. A method of detecting bandwidth anomalies in a data communication system, the method comprising:

> receiving a first traffic waveform representing a time distribution of data volume in a first direction in said data communication system in a first period of time;
>
> producing a correlation value representing a correlation of said first traffic waveform with a reference waveform; and
>
> producing a bandwidth anomaly signal when said correlation value satisfies a criterion.

An discloses a device for detecting data transmission rates in a system in which a serial bus such as an IEEE 1394 bus is implemented for the purpose of allocating appropriate bandwidth. In particular, An relates to determining when a particular data transmission is using less than the allocated bandwidth so that the remaining unused portion of the bandwidth can be re-allocated to other data transmission processes. An is particularly concerned with the

allocation of bandwidth in isochronous networks such as those implemented using an IEEE 1394 serial bus and makes no mention of detecting bandwidth anomalies or producing a bandwidth anomaly signal.

An fails to disclose each and every element in applicant's independent claims 1, 37, and 40 and does not show the identical invention in complete detail as recited in these claims.

For example, An describes finding a difference between an instantaneous rate value and an instantaneous filtered rate value, then comparing the difference with a reference, and then producing a comparison result signal. The instantaneous rate value of An is not a first traffic waveform representing a time distribution of data volume...in a first period of time, as recited in applicant's claims. More particularly, an instantaneous value is not equivalent to a waveform, especially one that represents a time distribution of data volume in a first period of time.

Since An fails to disclose a waveform, there can be no correlation of same with a reference waveform and thus An fails to produce a correlation value representing correlation of said first traffic waveform with a reference waveform, as recited in applicant's claims 1, 37 and 40.

Since no correlation value equivalent to the one recited in applicant's claims 1, 37 and 40 is disclosed in An, there can be no production of a bandwidth anomaly signal when the correlation value satisfies a criterion, as recited in these claims.

The Examiner alleges that bit stream data is received at 121 and through 122 and 123. This allegation is incorrect as 121 counts up or down whenever bit stream data in a word unit is transmitted from element 102. The counter value is cleared at the end of each sample period. Effectively 121 produces a number representing counts acquired during a sample period and this number

appears to be proportional to the data transmission rate. Thus, 121 appears to produce a value representing instantaneous data transmission rate. At the end of each sample period a new instantaneous data transmission rate value is produced. There is nothing to suggest that this instantaneous data transmission rate value is a waveform. It merely represents a count of the bitstream data acquired in a period of time. There is nothing to suggest that this value represents a time distribution of data volume in a first period of time and, intuitively, how could a single value represent a time distribution of data?

The Examiner takes the position that the bit stream data is the first traffic waveform recited in applicant's claim and that the correlation value is obtained when the unit 124 takes the difference between the sampled and filter values. However, with this interpretation, the correlation value is not produced in response to a correlation of the bit stream data and a reference waveform, but rather an error signal is produced in response to a count value derived from the bit stream data and an instantaneous average of the current and previous count values. The error detecting unit produces error values from the instantaneous sample values and the instantaneous average sample values. While a collection of these values may represent a waveform, the values are not considered by the error detecting unit as a collection or waveform, but rather are considered as separate values, each producing a separate error value and separate result at the first comparing unit 125. Therefore there is no correlation of waveforms, only the production of error values for each instantaneous count value. The values used to produce the error value do not include a first traffic waveform representing a time distribution of data in a first direction in said data communication system in a first period of time and the error value itself is not a correlation value representing correlation between two waveforms, as recited in applicant's claims 1, 37 and 40.

Finally, An fails to disclose a bandwidth anomaly signal when a correlation value based on a correlation of two waveforms satisfies a criterion. Rather, An produces a comparison result signal when comparing unit 125 determines

that an error representing a difference between current instantaneous values of rate and filtered rate exceed a reference error level.

In essence, An subtracts an instantaneous average sampled bit rate value from instantaneous sampled bit rate value to produce an error signal which is compared to a reference error level to produce a comparison result signal. Applicant's claims recite correlating a first traffic waveform representing a time distribution of data volume in a first period of time with a reference waveform and produces a bandwidth anomaly signal when a correlation value satisfies a criterion.

An provides no disclosure or suggestion to consider a first traffic waveform of the type recited, or to correlate that waveform with a reference waveform, or to use that correlation value to produce a bandwidth anomaly signal when the correlation value satisfies a criterion, as recited in applicant's claims.

Clearly, An fails to disclose each and every element of applicant's claims 1, 37 and 40 and therefore these claims are not anticipated and therefore the rejection under 35 U.S.C. §102(b) is improper and should be withdrawn.

Regarding claims 2 and 41, nowhere does An disclose or suggest that the comparison result signal produced should be regarded as a denial of service attack signal.

Regarding claims 3 and 42, An fails to disclose or suggest producing a correlation value of the type claimed.

Regarding claims 4 and 43, the output of the low pass filter 123 is not a second traffic waveform representing a time distribution of data volume in a second direction on the data communication system. Rather, the output of the low pass filter is a series of data values representing instantaneous average values produced from the sampled instantaneous values

representing counts or instantaneous transmission rate for transmitted data, i.e. in the transmission direction, i.e. a first direction. (See paragraph 21) Since the output of the lowpass filter is derived entirely from the sampled instantaneous values in the first direction, the output of the lowpass filter must also be associated with the transmission direction, i.e. the first direction. Therefore the output of the lowpass filter cannot represent a time distribution of data volume in a second direction on the data communication system. Furthermore, the output of the lowpass filter is not treated by the error detecting unit as a waveform, but rather as individual instantaneous values for which individual error values and comparison results are produced for an entirely different purpose, namely to produce an estimated data transmission rate value and not a bandwidth anomaly signal as recited in applicant's claims 4 and 43.

Regarding claim 5, the Examiner's rejection is not understood. The Examiner appears to indicate that the result signal produced by the error detecting unit 124 is a first waveform. But claim 5 depends from claim 1 for which the Examiner indicated that the bit stream data is the first waveform. Even if the first waveform is taken as the output of the sampler, for example, An neither describes nor suggests treating this output as a waveform and using it for correlating with a reference waveform, since An was not concerned with bandwidth anomalies, but rather producing an estimated data transmission rate. Furthermore to one of skill in the art, the term "traffic measurement values" would be understood to mean discrete units of packets or bytes, but not bit stream data. An discloses counting up or down whenever bit stream data in a word is transmitted from the external input/output interface unit 102 to the audio/video interface unit 104. (para 21). Thus An makes no use of "traffic measurement values" and certainly does not generate a first traffic waveform in response to same as recited in claim 5. These remarks also apply to claim 44.

Regarding claims 11, 12, 18, 19, 20, 35, 36, 50, 51, 57, 58, 59, 74 and 75, these claims are not anticipated due to their ultimate dependence on claim 1 and due to the additional subject matter they add to claim 1.

Regarding claims 15, 16, 54, 55, 70 and 71, An fails to specifically disclose or suggest the use of a packet counter or an octet counter in any direction, let alone first and second directions.

Regarding claims 17, 49, 56 and 72, An fails to suggest that any of the units 121, 122, 123, 124 or 125 includes a processor circuit as recited in these claims.

Regarding claims 21 and 60, An fails to describe or suggest the use of first and second sets of traffic measurement values to generate first and second traffic waveforms representing traffic in said first and second directions. The Examiner indicated that the first traffic is the sample value and the second traffic is the filter value, but as explained above, the filter values are produced entirely from the sample values and thus are representative of aspects of data traffic in the same direction, not in first and second directions as recited in applicant's claims.

Regarding claims 22 and 61, An fails to disclose or suggest receiving first and second waveforms representing first and second statistical measures of first and second time distributions respectively of data volume in first and second directions in said data communication system. As stated in connection with claims 4 and claim 21, the data in An is not monitored in a second direction and therefore there can be no second waveform.

Regarding claims 28, 67 and 73, as stated above, An fails to disclose or suggest monitoring data in a second direction and thus there is no disclosure or suggestion of producing the second set of traffic measurements recited in these claims.

Regarding claim 34, as stated above, An fails to disclose or suggest monitoring data in a second direction as recited in claim 34.

35 U.S.C. § 103

The Examiner has rejected claims 6, 8-10, 23, 25-27, 45, 47, 48, 62 and 64-66 based on 35 U.S.C. § 103(a) as being obvious and unpatentable over An in view of Gillberg et al. (Pat No: 6,393,316).

It is not contentious that discrete wavelet transforms are known and the Gillberg et al. reference merely describes one application of discrete wavelet transforms.

Gillberg et al disclose a device for monitoring heart rhythms. More specifically, Gillbert et al disclose a method and apparatus for reliable discrimination between ventricular depolarizations resulting from normal and abnormal propagation of depolarization wavefronts through the chambers of a patient's heart by means of a wavelet transform based method of analysis of depolarization waveforms.

The Examiner indicates the Gillberg et al. reference and the An reference are from the same or similar fields of endeavor but how could the an apparatus for detecting a data transmission rate by recognizing an amount of real-time transmitted data and a changed amount of the data so as to allocate an appropriate bandwidth required to transmit/receive data in a system in which a serial bus such as an IEEE 1394 is implemented be in the same field as methods and apparatus for detecting and treatment of cardiac arrhythmias. These are quite disparate areas of subject matter. The USPTO doesn't classify them in the same classifications. They deal with entirely different problems and one skilled in the art of data transmission and bandwidth

allocation is unlikely to be familiar with the issues of detection and treatment of cardiac arrhythmias.

There is no motivation to consider the teachings of the two references let alone combine the teachings. An is completely unconcerned with waveforms of any type, let alone waveforms that represent a time distribution of data volume in a first direction in said communication system in a first period of time. As discussed above, An considers instantaneous sample count values produced by counting whenever bit stream data in a word unit is transmitted and instantaneous average values derived from the instantaneous count values to produce an error value and then compares this error value with a reference to produce a result signal.

Claim 6 in An, for example, recites generating a first traffic waveform in response to a first set of traffic measurement values, but as stated above one of ordinary skill in the art would understand traffic measurement values to mean packets or bytes and not bit stream data in a word.

In addition, there is nothing to suggest anything other than the use of discrete instantaneous values as they are produced, to generate a corresponding result signal. After a given result signal and estimated data transmission rate is produced, the current sample value is cleared. There is no consideration of anything even resembling a waveform.

To cause the An device to consider the instantaneous values as a waveform would result in inoperability of the An device as it would no longer function to provide an estimated data transmission rate each time a sample value is produced. How would consideration of a waveform of the type claimed in applicant's claims be incorporated into the An device? Gillberg et al. disclose using the wavelet transform on a heart signal but with no waveform disclosed in the An reference, where would there be any motivation to modify the An device to produce or consider waveforms in bandwidth anomaly analysis and

to incorporate the use of a wavelet transform on traffic measurement values to detect bandwidth anomalies? There is no motivation.

The Examiner suggests that the motivation for using the method as taught by Gillberg et al. in the network of An is that a more accurate waveform can be constructed using 64 wavelet. But An doesn't even consider a waveform and never mentions one, so why would one of ordinary skill in the art be motivated to produce the specific waveform recited in the claim and use it to detect a bandwidth anomaly? Gillberg et al. doesn't suggest that waveforms should be used in bandwidth anomaly analysis and neither does An.

From the foregoing Applicant respectfully submits that there is no motivation to modify the An reference with the teachings of the Gillberg et al. reference as there is a great divide in technology between the two references and neither would lead to the use of a first traffic waveform of the type claimed or to subjecting a first set of traffic measurement values to a discrete wavelet transform as claimed. Consequently Applicant respectfully submits that claims 6, 8-10, 23, 25-27, 45, 47, 48, 62, and 64-66 are not obvious and comply with 35 U.S.C. §103. Accordingly, Applicant respectfully submits that the rejection is improper and should be withdrawn.

The Examiner has rejected claims 7, 24, 46 and 63 under 35 U.S.C. § 103(a) as being obvious and unpatentable over An in view of Sahinoglu et al. (Pub No: 2003/0021295).

Claim 7 recites:

7. The method of claim 6 wherein subjecting said first set of traffic measurement values to said Discrete Wavelet Transform comprises using Haar wavelet filter coefficients in said Discrete Wavelet Transform.

Sahinoglu et al disclose a method and system for allocating network bandwidth for traffic having variable data rates. More specifically, Sahinoglu et al disclose a method and system for dynamically allocating network resources for data stream traffic in a network by taking into account traffic features in a frequency domain.

Sahinoglu describes counting bytes received in a time slot, for M consecutive time slots to produce an arrival rate vector $X_{k,n}$. Paragraph 48 describes this arrival rate vector as being passed through a dyadic tree of scaling filters and wavelet filters where each branch produces a low frequency component and a high frequency component. The output of each scaling filter is then down sampled by a factor of two or in other words, the output of each scaling vector generates pair-wise average arrival rate vectors and the output of each wavelet filter produces pair-wise rate arrival differences. As a result, the output of the Haar wavelet transform is a vector W shown at 600 in Figure 6a, that does not represent a first traffic waveform representing a time distribution of data volume in a first direction in said data communication system in a first period of time, as recited in applicant's claims. Claim 7 is dependent upon claim 6 which refers to generating said first traffic waveform by subjecting said first set of traffic measurement values to a discrete wavelet transform. The result of the Discrete Wavelet Transform described by Sahinoglu is not a first traffic waveform of the type claimed by the present applicant. As such, applicant respectfully submits that Sahinoglu clearly does not describe the elements recited in claims 7, 24, 46 or 63 and therefore the rejection under 35 U.S.C. §103 is improper and should be withdrawn.

The Examiner has rejected claims 13, 14, 29, 30, 52, 53, 68 and 69 under 35 U.S.C. §103(a) as being obvious and unpatentable over An, in view of Eglin (Publication No.: 2004/0047320).

There is nothing to suggest that producing a first set of traffic measurement values should involve producing values representing a property of an Ethernet

statistics group in a remote monitoring protocol, where the first set of traffic measurement values is used in the method of claim 1 or 30 from which claims 13, and 29 depend or in the apparatus of claim 40 from which claims 52 and 68 depend.

In addition, there is nothing to suggest that a processor circuit should be caused to produce said first traffic waveform to communicate with a communication interface to receive said values representing said property of an Ethernet statistics group, where the first set of traffic measurement values is used in the method of claim 1 or 30 from which claims 14, and 30 ultimately depend or in the apparatus of claim 40 from which claims 53 and 69 ultimately depend.

Consequently, applicant respectfully submits that the rejection of claims 13, 14, 29, 30, 52, 53, 68 and 69 under 35 U.S.C. §103 (a) is improper and should be withdrawn.

As for claims 31-33, these claims relate to packet counters and octet counters for counting packets or octets in first and second directions. In connection with the Examiner's allegations of anticipation, as stated earlier, An fails to disclose these types of counters but rather refers to counting up or down whenever bit stream data in a word unit is transmitted from the external input/output interface unit 102 to the audio/video interface unit. There is nothing to suggest that counting bit stream data in a word is the same as counting packets or octets, let alone using such counters to count packets in first and second directions.

As for the Examiner's use of official notice for teaching the use of counters in first and second directions, applicant respectfully submits that this ignores the context of the claim as a whole and its intermediate dependencies which ultimately cause it to depend from method claim 1. In applicant's claims the use of packet counters is for producing first and second waveforms that are

ultimately correlated with each other to produce a correlation value which is then compared to criteria to determine whether or not to issue a bandwidth anomaly signal. An was concerned with bandwidth allocation and never concerned himself with or had any need to concern himself with first and second waveforms representing traffic in first and second directions in the communication system for detecting bandwidth anomalies. Therefore applicant respectfully submits that claims 31-33 are not obvious and comply with 35 U.S.C. §103 (a).

In connection with Claims 38 and 39, essentially, claim 38 is a computer readable medium claim and claim 39 is a computer readable signal clam that cover a computer readable medium and signal respectively, encoded with codes for directing a processor to execute the method of claim 1. The method of claim 1 has been shown above to be neither anticipated nor obvious in view of An and therefore claims 38 and 39 should also neither be anticipated nor obvious in view of An. Therefore the rejection of claims 38 and 39 under 35 U.S.C. §102 or in the alternative 35 U.S.C. §103 (a) is improper and should be withdrawn.

This response is accompanied by an Information Disclosure Statement.

Applicant respectfully requests further favorable consideration of the application.

Respectfully submitted,

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JWK:JEB:jsw
Encl: 3 Replacement Sheets bearing Drawing Figures 2, 3, 5 respectively
3 Annotated Sheets Showing Changes to Drawing Figures 2, 3, 5 respective